

Peale (A. C.)

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F. V. HAYDEN, U. S. Geologist-in-Charge.

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# JURA-TRIAS SECTION

OF

SOUTHEASTERN IDAHO AND WESTERN WYOMING.

BY

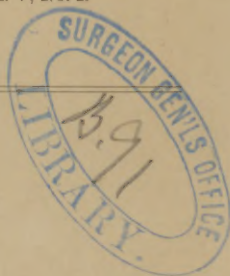
A. C. PEALE, M. D.

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## **Art. VI.—Jura-Trias Section of Southeastern Idaho and Western Wyoming.**

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**By A. C. Peale, M. D.**

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In connection with Paleontological Papers No. 9, published in this Bulletin (Art. V, pp. 105–117) by Dr. C. A. White, in which a number of new and specially interesting species of fossils are described, I have thought it may be both interesting and useful to give briefly a few notes on the section of the Jura-Trias of the region from which these organic remains were obtained.

The rocks under consideration are exposed in considerable areas in the district assigned me for examination during the field-season of 1877, especially between the Wyoming and Portneuf Ranges. The former is in longitude  $110^{\circ} 48'$  and the latter in approximate longitude  $112^{\circ}$ .

The region thus indicated is one of complicated folds and great displacements, and the Jura-Trias rocks, with the conformably underlying Carboniferous, enter largely into the structure of the mountains; entire ranges, indeed, being carved from them.

The Triassic Red Beds are found on the summit and on the western slopes of the Wyoming Range, in the former occupying a broad synclinal depression, and in the latter dipping westward into the valley of John Day's River. An immense fault extends along the eastern front of the Wyoming Range, giving it a monoclinal structure at this place, and when we cross the fold, which forms the western side of the range, we find another similar fault along the eastern side of the Salt River Range, which is parallel to the Wyoming Range, and only from eight to ten miles west of it. These faults are several thousand feet in extent.

In the Salt River Range, the Jura-Trias rocks are found entering into the complicated folds that form its central portions.

Twenty-five miles farther west, we reach the Blackfoot Basin, in which the Jura-Trias forms a large portion of the surface, the ridges having a comparatively low elevation, and the folds not being so greatly eroded as in the higher mountains. It is in this locality that the interesting collection of fossils, described by Dr. White, was found, and to which his paper is confined. The following is the general section of the Jura-Trias, beginning at the top:



## General Section of Jura-Trias in Southeastern Idaho and Western Wyoming.

JURA-TRIAS.	JURASSIC.	<i>Belemnites</i> Beds.	5. Red and gray shales with green sandstones and irregular greenish arenaceous limestones at the top. Thickness, 700 feet.
		<i>Pentacrinus</i> Beds.	4. Laminated limestones, blue at base, passing into gray at top, succeeded above by grayish, calcareous shales; many of the layers are probably arenaceous. Thickness, 800 feet.
	TRIASSIC?	<i>Red</i> Beds.	3. Red quartzitic sandstones with shaly arenaceous and calcareous layers at the base of the section. These are probably the equivalent of the typical "Red Beds" of the Eastern Rocky Mountains. Thickness, 1,000+ feet.
		<i>Meekoceras</i> Beds.	2. Alternations of reddish and greenish sandstones and arenaceous and calcareous shales with blue and gray limestones, generally laminated. Thickness, 3,000+ feet. These with No. 1 are the beds of the section given in Dr. White's paper (as that of locality No. 1). The beds are fossiliferous at four horizons, containing species of a new Triassic? genus named <i>Meekoceras</i> by Professor Hyatt, together with forms that have been heretofore regarded as of Jurassic age.
CARBONIFEROUS?			1. Massive grayish-blue limestone, overlaid by quartzite and dark blue laminated limestones. Thickness, 1,200+ feet.

The thicknesses in this section are estimated, and when the region is more thoroughly studied may have to be somewhat modified.

The fossils described in Dr. White's paper came from No. 2, which I have called the "*Meekoceras* Beds," from the new genus named by Professor Hyatt. They are the following:

*Meekoceras aplanatum* White.

*Meekoceras mushbachanus* White.

*Meekoceras gracilitatis* White.

Besides these, the following were obtained:

*Arcestes?* *cirratus* White.

*Arcestes?* sp.?

*Arcestes?* sp.?

*Terebratula semisimplex* White.

*Terebratula augusta* Hall and Whitfield?

*Eumicrotis curta* M. & H.

*Aviculopecten idahoensis* Meek.

*Aviculopecten altus* White.

*Aviculopecten pealei* White.

*Gervillia* sp.?

No. 3 yielded no fossils.

No. 4 yielded the following:

*Pentacrinus asteriscus*.

*Camptonectes bellistriatus*.

*Trigonia* sp.?

*Myacites* sp.?

From No. 5 I obtained :

*Belemnites densus.*

*Aviculopecten idahoensis ?*

*Gryphaea* sp. ?

Undetermined bivalves.

At no one point was the entire section, as given above, exposed. The evidence for the section is as follows :

Nos. 1 and 2 were determined by the section at and near Station 66, south of John Gray's Lake (section at locality No. 1 in Dr. White's paper).

Near Station 56 in the Salt River Range, about 28 miles east of Station 66, beds lithologically similar to those of No. 2 in the general section just given, and containing *Aviculopecten pealei* and *Gervillia*, were seen in position above limestones similar to those of No. 1, which here contained quantities of *Productus multistriatus*. On this ground I have referred No. 1 to the Carboniferous.

Above the arenaceous and calcareous bed (which correspond lithologically and paleontologically with No. 2 of the section) in the Salt River Range are the red sandstones (No. 3). They are also probably in place above the section of Station 66, as is evident from the following :

Descending the ridge leading southwest from Station 66, southwestwardly dips are noted in the strata last seen (the upper ones of section at locality No. 1, White's paper). After passing through the timber, which conceals the remainder of the section, we come to red sandstones, in all respects like those of the Salt River Range, having a northeasterly dip. We have therefore crossed a synclinal.

These facts, therefore, appear to justify me in connecting the sections.

Nos. 4 and 5 are determined by sections made in John Day's Valley, where they rest conformably on the "Red Beds." The entire section is conformable. Above the "Belemnites Beds" is a quartzite followed by a series of shales and sandstones several thousand feet in thickness, which has been referred to the Cretaceous.

It is not my intention to enter into any paleontological discussion ; but there are some points based on the paleontological contents of the section to which I wish to refer briefly.

*Pentacrinus asteriscus* was found at a number of localities, other than those of the section, throughout the district, and always in beds above the horizon of the Red Beds. The following were the associated fossils identified by Dr. White :

*Camptonectes bellistriatus.*

*Ostrea strigulecula.*

*Trigonia* sp. ?

*Tancredia* sp. ?

*Modiola* sp. ?



*Myalina* sp.?

*Myacites* sp.?

*Neritina* sp.?

Undetermined Conchifers and Gasteropods.

I believe the only instance in which *P. asteriscus* has been found associated with Triassic forms is the one mentioned in the Reports of the Fortieth Parallel Survey,\* in which it is stated that it was found associated with what are regarded as unmistakable Alpine Trias fossils, and a *Spirifera*, a palæozoic type. Mr. Emmons says:† “It should be stated also that these disks of *Pentacrinus* found in the Dun Glen limestone vary somewhat from the type-specimens, and are all of larger size, reaching one-fourth of an inch in diameter, while those of Jurassic age scarcely reach one-fifth of an inch. Professor Whitfield suggests that the Dun Glen variety may possibly be a new species.”

*Eumicrotis curta* was not found associated with *Pentacrinus* anywhere in our district, but at several localities where the section was obscure it was found with

*Aviculopecten idahoensis*,

*Lingula brevirostris*,

*Myalina* sp.?,

*Myacites* sp.?, and

several undetermined species of *Aviculopecten*.

The beds from which they were collected were above the “Red Beds,” but I was unable to determine their relation to the “*Pentacrinus* Beds.”

In other areas, *Eumicrotis curta* has been found associated with species of Jurassic aspect. In the areas surveyed by the Fortieth Parallel Survey, it occurs with

*Belemnites*,

*Gryphæa*.

*Terebratula augusta* Hall & Whitfield,‡ as Dr. White remarks, has been considered by the authors as a Jurassic species.

The Cephalopods (from No. 2 of the section described) by Professor White are, according to his identifications, unquestionably Triassic according to European standards, resembling certain Cephalopods of the Muschelkalk of Europe.

The only other Cephalopods from our Western Trias are those obtained by the Fortieth Parallel Survey from the Star Peak Group, which have been considered the faunal equivalents of the St. Cassian and Hallstadt beds of the Austrian Alps. The Star Peak Group is referred by King to the Upper Trias, and is supposed to correspond to the Upper Red Beds of the Eastern Seas (*Rocky Mountain Region*, &c.). If this be so, we may perhaps consider the “*Meekoceras* Beds” of the section as the

\* Descriptive Geology, vol. ii, p. 711. Systematic Geology, vol. i, pp. 279, 280.

† Descriptive Geology, vol. ii, p. 711.

‡ Report U. S. Geol. Expl. 40th Parallel, Systematic Geology, vol. i, p. 292.

equivalent of King's Koipato Group, which is below the Star Peak Group. The localities, however, are too widely separated, and too imperfectly known, as regards the one in my district, to attempt to correlate the two sections more definitely.

We cannot be too cautious in predicating the age of these beds before a detailed study of the stratigraphy is made, and a careful paleontological examination of the whole region undertaken and completed.

The "Meekoceras Beds," when first seen by us, were referred to the Upper Division of the Carboniferous.

There are numerous circumstances that appear to indicate that in the Jura-Trias, as in other formations, we have at either end of the formation a plane of paleontological indefiniteness, as it may be called; and the probability is that in the immediate vicinity of the lines separating the formations the strata should be considered as transition series. When the deposition of sediments is continuous from one formation to another, it is not so strange, as Dr. White has frequently remarked, that forms of life should continue uninterruptedly from one to the other, and that we should find, as in New Mexico,\* Triassic plants at the top of the Jura, and as in our district and many other localities Jurassic invertebrates near the base of the Trias, and as in Nevada palæozoic types in the Lower Mesozoic.

In predicating the age of any group of beds, the organic contents of all descriptions, *vertebrate*, *invertebrate*, and *vegetable*, should be considered.

With the accumulation of data, many of the points that are now obscure and doubtful will assume the certainty of facts.

Until we know more of the rocks under consideration, I shall retain the name Jura-Trias for the formation.

To recapitulate, the investigations of 1877 in Southeastern Idaho and Western Wyoming indicate—

1. The lithological separation of the Jura-Trias into three divisions,—the upper and lower calcareous, and the middle mainly siliceous.

2. The presence of Jurassic forms in the upper division, the absence of organic remains in the middle group, and the presence in the lower of Triassic types associated with what have heretofore been regarded as Jurassic species.

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\* See Report U. S. Geol. Surv. for 1875, 1876, pp. 84-87.







